REMARKS

In the Office Action of April 21, 2008, claims 20, 21, 23 and 24 were indicated to be allowable if rewritten in independent form. Claim 11 was rejected under 35 U.S.C. 102(b) as anticipated by Wood, "Market Microstructure Research Databases: History and Projections," J. of Business & Economics, Vol. 18, Iss. 2, p. 140 (April 2000). Claims 1, 10, 11, 12, 15 and 25-28 were rejected under 35 U.S.C. 103(a) as unpatentable over Dacorogna et al., "The Distribution of Extremal Foreign Exchange Rate Returns in Extremely Large Data Sets" (hereinafter Dacorogna 1995). Claims 2, 3, 7-9, 13, 14, 18, 19 and 22 were rejected under 35 U.S.C. 103(a) as unpatentable over Dacorogna in view of Zusman et al. (USP 5,987,432). Claims 4 and 16 were rejected under 35 U.S.C. 103(a) as unpatentable over Dacorogna in view of Wood. Claims 5, 6 and 17 were rejected under 35 U.S.C. 103(a) as unpatentable over Dacorogna 1995 in view of Wood and Zusman. Claims 4-6, 9, 16 and 22 were rejected under 35 U.S.C. 112, second paragraph, as indefinite.

Applicant wishes to thank the Examiner for the indication that claims 20, 21, 23 and 24 would be allowable if rewritten in independent form. Claim 11 has been amended to include the limitations of claim 23. As a result claim 11 and claims 12-19, 24, 27 and 28 which are dependent thereon are believed to the patentable and in condition for allowance.

As the Examiner is aware, applicant's invention is directed to methods of filtering time series data by testing for certain errors. A specific practical application of applicants' claimed methods as described at paragraphs 0002 and 0003 on page 1 of the specification is in the filtering of time series financial data such as a sequence of quotes for a financial instrument. In one embodiment, a wide variety of errors are tested for including decimal error, scaling error, domain error, a monotonic series of quotes, a long series of quotes and credibility.

The rejection of the claims on Wood and Darcorogna is respectfully traversed. Wood mentions the need for error filters in processing quote date and describes one type of error in which a price of $4 per share appears in a series of prices of $40 per share. Wood describes this error as a common kind of error and states that it is easy to identify but he does not disclose how it is identified.

The Examiner asserts that this constitutes decimal error filtering and testing for credibility. Applicant disagrees.

Applicant notes first that Wood does not use the terms decimal error or credibility. These terms are supplied by the Examiner. Wood merely states the problem as a $4 price amid $40 prices and notes that "it is likely that the marked sense card reader on the floor of the NYSE dropped a digit."

Second, it is apparent from the above quote that Wood's example relates to a missing digit not to an incorrect digit. A missing digit is not what applicant is referring to as a decimal error. Specifically, in paragraph 0026 of his specification, applicant defines a decimal error as a wrong decimal digit, not a missing decimal digit. Applicant is allowed to be his own lexicographer. Having defined a term in the specification, this interpretation applies also to the use of that term in the claims. As the MPEP notes at §2111.01(I) citing In re Vogel, 422 F.2d 438, 441, 164 U.S.P.Q. 619, 622 (CCPA 1970):

> "It is only when the specification provides definitions for terms appearing in the claims that the specification can be used in interpreting claim language."

Thus, the term "decimal error" as used in applicant's claims is to be understood as referring to wrong decimal digits, as distinct from missing decimal digits. The source of these decimal errors is typically errors in cache updates as described at paragraph 0324 of applicant's specification.

Third, Wood does not explain how his filter operates. As a general rule, a prior publication such as Wood or Dacorogna 1995 must contain a full enabling description to be an anticipation. Seymour v. Osborn, 78 U.S. (11 Wall) 516 (1870); Bristol-Myers Squibb Co. v. Ben Venue Laboratories, Inc., 246 F. 3d 1368, 1374, 58 USPQ 2d 1508 (Fed. Cir. 2001); Forest Laboratories, Inc. v. Ivax Pharmaceuticals, Inc., 84 USPQ 2d 1099, 1103 (Fed. Cir. 2007). As the MPEP notes at §2121.01 citing Elan Pharm., Inc. v. Mayo Found. for Med. Educ. & Research, 346 F.3d 1051, 1054, 68 U.S.P.Q. 2d 1373, 1376 (Fed. Cir. 2003):

> "The disclosure in an assertedly anticipating reference must provide an enabling disclosure of the desired subject matter; mere naming or description of subject matter is insufficient, if it cannot be produced without undue experimentation."

In the absence of any disclosure in Wood of how his filter operates. Wood is not an enabling disclosure.

Dacorogna mentions a decimal error filter at the top of page 15 of his paper and states that it is used to identify "wrong decimal digits due to failed text updates." However, Dacorogna, likewise, does not describe how the filter operates to detect decimal errors.

For these reasons, it is respectfully submitted that neither Wood nor Dacorogna is an enabling disclosure of a decimal error filter.

As mentioned above, there can be a variety of different types of errors in times series financial data.

Decimal errors are discussed in paragraphs 0323-0344 of the published application (page 44 to 48 of the specification). As explained in paragraph 0324, a decimal error can occur when cache memories are updated by partial updates of varying length rather than full refreshment of data. In this situation, subsequent partial update messages may assume that the cache data contains a decimal digit of a certain value established by a message that has been lost when, in fact, the cache contains a different decimal digit established by an earlier message. If a partial update message is lost, the portion remaining in the cache may no longer be correct and subsequent quotes may be in error. Such errors are called decimal errors in the specification.

For example, as described in paragraph 0325, assume a correct quote 1.5205/1.5215 where the first term is the bid price and the second term the ask price is stored in the cache in the form 1.5205/15. This price is then updated by the message "198/08" which reflects a new quote 1.5198/1.5208 but the message is lost so that the previous quote remains in the cache. If a new message "95/05" is then sent with the intention of changing the quote stored in cache to 1.5195/05, it will instead change the stored quote to 1.5295/05 since the last quote stored in cache was 1.5205/15.

The testing for decimal errors is described in paragraphs 0327 to 0344. These steps include testing for a value change between successive quotes that is close to a power of ten (paragraph 0328), testing the time interval between successive quotes (paragraph 0329), testing the validity of a corrected quoted (paragraph 0330), comparing the credibility of a corrected quote with the credibility of the original quote (paragraph 0331), and testing if the bad decimal digit remains the same throughout the decimal error (paragraph 0332).

Scaling errors are described at paragraphs 0345 to 0357 (pages 48 to 50 of the specification). These errors are changes in the scale of a quote by a constant factor relative to

prior quotes. These might arise in the event of a revaluation of currency, a stock split or a change in quoting practices.

Applicant's process tests for scaling errors by testing for substantial changes between a new quote and a previous quote as detailed in paragraph 0348. In particular, in the embodiment described in paragraph 0348 the ratio of the current quote to the previous quote is tested to see if it falls between the square roots of 0.1 and 10. (The greater than sign at line 6 of paragraph 0348 should be a less than sign as will be evident on a moment's consideration and as is confirmed by the correct use of the less than sign in the next to last line of paragraph 0348.) If the ratio does not fall within these bounds, the value of the current quote is increased by the power of 10 that causes it to fall within these bounds. This power of 10 provides a new scaling factor.

Domain errors are described at paragraph 0284 of the published application (page 40, line 15 of the specification as filed) which states: "A domain error: an illegal level p of the filtered variable, i.e., $p<P_{min}$ (as opposed to a merely implausible level)." Examples of domain errors in the case of bid-ask quotes are identified in paragraphs 0287, 0288, 0289 and 0292: $p_{bid}<p_{min}$, $p_{ask}<p_{min}$, $p_{ask}<p_{bid}$, $p_{ask}\leq p_{bid}$. To understand the nature of the first two of these errors, it is necessary to realize that p_{min} is the lower limit of the allowed domain of quotes as set forth in paragraph 0276. Thus, there is a domain error if a bid, p_{bid}, or an ask, p_{ask} is less than this lower limit. With respect to the last two examples of domain errors, since the bid should be less than the asking price, there is a domain error if $p_{ask}<p_{bid}$ or $p_{ask}\leq p_{bid}$. As indicated in paragraph 0285, domain error quotes are rejected.

A monotonic series of quotes is a series of quotes that rise steadily or fall steadily. Such a series is sometimes inserted in the time series intentionally as described at paragraph 0379 to 0398 of the application (pages 52 to 55 of the specification).

A repeated series of quotes is a series of identical quotes. Such a series is sometimes inserted intentionally in the time series as described at paragraph 0399 to 0419 (pages 55 to 58 of the specification.

Claim 1 has been amended to limit the claim to the testing of time series financial data. Time series financial data is stochastic, volatility clustering and generally mean reverting. These properties of time series financial data make it particularly amenable to correction using the filtering processes recited in the claims of the present application. Claim 1, which has been rejected on Dacorogna 1995, is believed patentable at least because it recites testing the data for

decimal error. As emphasized above, neither Dacorogna 1995 not Wood provides an enabling disclosure of a method for testing for decimal error.

Dependent claims 2 through 10 are believed patentable for the same reasons claim 1 is patentable.

With respect to claim 2, the Examiner acknowledges that Dacorogna 1995 does not disclose testing for a monotonic series of quotes but asserts that Zusman teaches testing for duplicate and redundant input feeds. This, however, is not a disclosure of a method for testing for a monotonic series of quotes as recited in claim 2. As set forth in paragraph 0380, a monotonic series in one in which the magnitudes of all elements are successively increasing or successively decreasing. While Zusman describes a system for distributing financial data, Zusman's error correction procedures rely on manual intervention or error messages. Col. 8, lines 12-27 and col. 12, lines 25-37, on which the Examiner relies, relate to redundant input feeds from an exchange. This, however, says nothing about testing for a series of monotonic quotes. Col. 9, lines 29-31; col. 10, lines 33-36; col. 14; and col. 15, lines 25-53 relate respectively to error checking in the form of requesting retransmission of data, manual processing of errors, range checking logic, and automatic processing of exchange-generated correction messages. None of this has anything to do with testing for monotonic series of quotes.

Dependent claims 4 and 16 have been amended to remove any indefiniteness by specifying testing whether a difference is within a predetermined value of the next power of ten. This claim language is supported by paragraph 0328 of the specification which describes testing whether the difference is within 0.6999 of the next power of ten. Dependent claims 9 and 22 have been amended to change the word "level" to "value," thereby making it clear that the reference is to price data rather than volume.

Claims 7 and 8 are believed patentable because Dacorogna and Wood do not disclose a process for testing for decimal error. As noted above, while Dacorogna mentions decimal error, he does not describe how he tests for it and he does not describe the specific tests enumerated in claims 7 and 8. Likewise, Wood does not describe testing for decimal error.

Independent claim 11 has been amended to include the limitations of claim 23 which was indicated to be patentable. Dependent claims 12-19, 22, 24, 27 and 28 are believed patentable for the same reason claim 11 is patentable.

Newly added claims 29-37 are directed to applicant's use of a numerical value of a credibility measure in filtering time series financial data. The calculation of credibility is described beginning at paragraph 0090 and the determination of credibility and trust capital for the case of level filtering is set forth at paragraphs 0097 to 0118. The equations of claim 37 are based on equations 4.1, 4.3, 4.4, 4.6 and 4.7.

Claim 29 is believed patentable because the references do not teach or suggest the use of numerical value of a credibility measure.

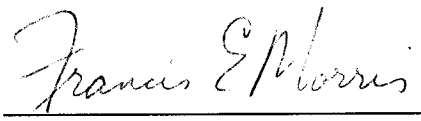
Dependent claims 30-37 are believed patentable for the same reasons claim 29 is patentable. In addition, these claims are believed patentable because they recite additional features of applicant's invention.

Aside from the fee for an extension of time and additional claims, no additional fee is believed to be due for filing this response. However, if a fee is due, please charge such fee to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310.

If the Examiner believes a telephone interview would expedite prosecution of this application, she is invited to call applicant's attorney at the number given below.

Respectfully submitted,

Date: October 21, 2008



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